Eyes, ears of US military take shape in high-tech labs

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The Global Hawk can fly autonomously to altitudes above 60,000 feet. Image: NASA

A Global Hawk robotic plane, hovering more than 11 miles above Afghanistan, can snap images of Taliban hide-outs so crystal clear that U.S. intelligence officials can make out the pickup trucks parked nearby - and how long they've been there.

Halfway around the globe in an underground laboratory in El Segundo, Calif., Raytheon Co. engineers who helped develop the cameras and sensors for the pilotless spy plane are now working on even more powerful devices that are revolutionizing the way the military gathers intelligence.

The new sensors enable flying drones to "listen in" on cell phone conversations and pinpoint the location of the caller on the ground. Some

can even "smell" the air and sniff out chemical plumes emanating from a potential underground nuclear laboratory.

Reconnaissance is "now the centerpiece of our global war on terrorism," said David L. Rockwell, an electronics analyst with aerospace research firm the Teal Group Corp. "The military wants to have an unblinking eye over the war zone."

And that has meant a growing and potentially huge business for the defense industry at a time when the Pentagon is looking at cutting back on big-ticket purchases such as fighter jets and Navy ships.

The drone electronics industry now generates about $3 billion in revenue, but that's expected to double to $6 billion in the next eight years, Teal Group estimates.

The industry's projected growth has fueled a surge in mergers and acquisitions of companies that develop and make the parts for the sensor systems.

"There has been an explosion in the reconnaissance market," said Jon B. Kutler, founder of Admiralty Partners, a Century City, Calif., private investment firm that buys and sells small defense firms.

"It's one of the few remaining growth areas."

Kutler's company recently acquired Torrance, Calif.-based Trident Space & Defense, which manufactures hard drives that enable drones to store high-resolution images.

Trident, which has about 70 employees, has seen its sales more than double to about $40 million over the last five years.

The demand for sensors is growing as the Pentagon steps up use of drones for intelligence gathering.

More than 7,000 drones - ranging from the small, hand-launched Raven to the massive Global Hawk - are currently deployed in Iraq and Afghanistan. Though some have been outfitted with laser-guided bombs or missiles - grabbing most of the news headlines - all are equipped with sensors for reconnaissance and surveillance work.

The most advanced cameras and sensors are on the Global Hawk, a long-endurance, high-altitude drone that can fly for 30 hours at a time at more than 60,000 feet, out of range of most antiaircraft missiles and undetectable to the human eye.

Peter W. Singer, author of "Wired for War," a book about robotic warfare, compares the technology to the popular "Where's Waldo" children's books, in which readers are challenged to find one person hidden in a mass of people.

The latest detectors not only can pick out Waldo from a crowd, but know when Waldo may have fired a rifle. Such sensors can detect the heat from the barrel of a gun and estimate when it was fired.

Many of the sensors have been developed by Raytheon engineers in El Segundo, where the company has had a long history of developing spy equipment, including those found on the famed U-2 spy plane.

Some of the more advanced cameras can cost more than $15 million and take 18 months to make. Raytheon develops the cameras in a humidity-controlled, dust-free laboratory to ensure that they are free of blemishes.

Each basketball-sized camera "must be perfect," said Oscar Fragoso, a Raytheon optical engineer. "If it isn't, we know we're putting lives at

risk."

Raytheon has begun to face stiff competition as other aerospace contractors vie for its business.

Sparks, Nev.-based Sierra Nevada Corp., which is known for its work on developing parts for spy satellites, has developed a sensor system, named the Gorgon Stare, that widens the area that drones can monitor from 1 mile to nearly 3 miles.

Named for the creature in Greek mythology whose gaze turns victims to stone, the sensor system features 12 small cameras - instead of one large one. It is to be affixed to Reaper drones before the end of the year.

With the multiple cameras, the operator can follow numerous vehicles instead of just one, said Brig. Gen. Robert P. Otto, the U.S. Air Force's director of intelligence, surveillance and reconnaissance. "By the end of the year, we're going to be fielding capabilities that are unlike anything we've used before."

But with an increase in the number of drone patrols and new sensor technology, the Air Force will be "drowning in data," Otto said. "That means we're going to need a lot more people looking at computer screens."

The Pentagon has said that drones last year took so much video footage that it would take someone 24 years to watch it all.

By this time next year, the Air Force expects to have almost 5,000 people trawling through the images for intelligence information. That's up from little more than 1,200 nine years ago.

"The reconnaissance work that's being done now takes seconds, where it

used to take days," Otto said. "We're pushing the edge of technology."

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